ASSIGNMENT 4

Textbook Assignment: "Gas Welding" and “Soldering, Brazing, Braze Welding, and Wearfacing," pages 5-1 through 6-8.

Learning Objective: Identify the principles and techniques of operating gas welding equipment.

4-1. When gas welding, you should consider which of the following factors?

1. Edge prep, spacing, and joint alignment
2. Flame adjustment and rod and torch manipulation
3. Temperature control, before, during, and after the welding process
4. All of the above

4-2. Welding tips are made of what special type of alloys?

1. Carbon and zinc
2. Tin and iron
3. Aluminum, silver, and titanium
4. Copper, bronze, and stainless steel

4-3. In a low-pressure torch, the fuel pressure in pounds per square inch (psi) is

1. 1 psi or less
2. 2 to 3 psi
3. a constant 5 psi
4. greater than 7 psi

4-4. The volume of oxygen and fuel-gas burned at the torch tip is controlled through the use of what devices?

1. One needle valve at the torch
2. Two needle valves at the torch
3. One separate mixing head for each gas
4. Two different size tips

4-5. The required amount of fuel-gas enters a low-pressure welding torch as the result of suction created in the torch by a jet of high pressure

1. nitrogen
2. gasoline
3. oxygen
4. helium

4-6. In a medium-pressure welding torch, the working pressure of oxygen and fuel-gas is equal.

1. True
2. False

4-7. In oxygas welding, filler rods serve what primary function?

1. As an electrical connection between the torch and the workpiece
2. As a source of metal to fill the weld joint
3. As a surface for braze welding
4. As a heat conductor

4-8. The copper coating on steel filler rods enable the rods to

1. melt at a higher temperature
2. melt at a lower temperature
3. clean the weld joint of impurities
4. resist corrosion during storage

4-9. The diameter of the filler rods used for gas welding two steel plates depends on which of the following factors?

1. The type of steel that the plates are made of
2. The thickness of the metal
3. The job specifications
4. The type of welding torch

4-10. The type of filler rods used in oxygas welding is determined by what factor?

1. Federal, military, or Navy specifications
2. The composition of the rod coatings
3. The length and shape of available rods
4. The type of welding position required

4-11. Welding torch tip size is designated by a number stamped on the tip. The tip size is given in the number drill size of the orifice. Additionally, as the drill size number increases, the size of the drill decreases.

1. True
2. False

4-12. While welding, you have difficulty controlling the melting of the welding rod and the welds are being made too fast and their appearance and quality are unsatisfactory. What mistake have you most likely made ?

1. Used a welding rod that is too small
2. Used incorrect polarity
3. Used an incorrect “dragging technique
4. Used a welding tip that is too large

4-13. After a welding torch is ignited, what factor dictates the adjustment to the flame you must make?

1. The thickness of the metal
2. The type of filler rod used
3. The type of metal being welded
4. The polarity being used

4-14. What type of flame is best used for welding high-carbon steels, hardfacing, and for welding non-ferrous metals?

1. Neutral
2. Carburizing
3. Oxidizing
4. Normalizing

4-15. What type of flame is correct to use for most metals?

1. Neutral
2. Carburizing
3. Oxidizing
4. Normalizing

4-16. What flame is limited in use and is harmful to many metals?

1. Neutral
2. Carburizing
3. Oxidizing
4. Normalizing

4-17. What is the first step you should take when needle valves, in a torch, fail to shut off when hand tightened in the usual manner?

1. Use a wrench to tighten it
2. Open the valve and using the working gas pressure blow out any foreign matter
3. Remove the stem assembly and wipe the seat clean
4. Have the parts replaced by qualified personnel

4-18. When there is a leak around the torch valve stem, you should tighten the packing nut or repack it if necessary. For repacking, NEVER use oil. Instead, you should use only

1. dry packing
2. the packing recommended by the manufacturer
3. heavy-weight packing
4. granulated packing

4-19. To ensure good performance of welding tips, you must remove regularly deposits of what type?

1. Copper and zinc oxide
2. Sodium carbide and phosphorus
3. Ferrous oxide and sodium phosphate
4. Slag and carbon

4-20. You can safely recondition the end of a torch tip that has become rough and pitted by following what procedure?

1. Insert a drill one size larger than the orifice opening into the tip end
2. Insert a tip drill into the seat opening and twist until penetration can be made at the tip-end opening
3. Place emery cloth, grit side up, on a flat surface and rub the tip end over it until the tip is back to its original condition
4. Use a bench grinder to square off the end of the tip, then drill out the orifice

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Learning Objective: Identify proper oxygas welding techniques.

4-21. What type of file is commonly used to recondition the tip end of a welding torch?

1. Mill
2. Pillar
3. Square
4. Taper

4-22. When forehand welding, you should point the flame in the direction of travel and hold the tip at a angle of how many degrees?

1. 15°
2. 30°
3. 45°
4. 60°

4-23. The forehand method of oxygas welding is best for welding

1. heavy plate that is between 1 to 3 inches thick
2. sheet and light plate up to 1/8 of an inch thick
3. sheet plate that is between 1 to 2 inches thick
4. any type of metal

4-24. When backhand welding, you ensure the torch tip precedes the rod in the direction of welding and the flame points back at the molten puddle and completed weld. At what angle do you hold the tip to the plates or joints to be welded?

1. 15 degrees
2. 30 degrees
3. 45 degrees
4. 60 degrees

4-25. When welding plates thicker than 1/8 inch, you should use the backhand method instead of the forehand method for which of the following reasons?

1. It uses less welding rod and results in less puddling of molten metal
2. It requires less motion of rod and torch tip and increases welding speed
3. It results in better control of large puddles of molten metal and more complete fusion at the root of the weld
4. All of the above

4-26. By using the backhand technique and a reducing flame, rather than the forehand technique and a neutral flame, it is possible to weld steel plates faster for which of the following reasons?

1. More of the base metal is melted during the welding operation
2. It is not necessary to control the heat on the plate
3. A thin surface layer of steel absorbs carbon and reduces the melting point of steel
4. All of the above

4-27. For thick plate and pipe, which of the following factors is an advantage of using multilayer welding instead of single layer welding?

1. The final layer is easier to control to get a smooth surface
2. Improved ductility of the weld metal since one layer cools to a black heat before being reheated when an additional layer is made
3. There is better control over each layer since carrying of large puddles of molten metal is avoided
4. All of the above

4-28. Sheet metal is easily melted and does not require special edge preparation.

1. True
2. False

4-29. On what size of plate do you make a slight root opening between the parts to get complete penetration?

1. 1/16 to 1/8 inch
2. 3/16 to 1/4 inch
3. 1/4 to 3/8 inch
4. 3/8 to 1/2 inch

4-30. What size plate requires beveled edges 30 degrees to 45 degrees and a root opening of 1/16 inch?

1. 1/16 to 1/8 inch
2. 3/16 to 1/4 inch
3. 1/4 to 3/8 inch
4. 3/8 to 1/2 inch

4-31. When oxygas welding low-alloy steels, you must take what action to relieve stresses developed during the welding process?

1. Chip and peen after welding
2. Quench after welding
3. Heat-treat before and after welding
4. Use special flux in the welding process

4-32. In the process of welding wrought iron, what causes the surface of the molten puddle of weld metal to appear greasy?

1. The high carbon content of the wrought iron
2. The slag used in manufacturing the wrought iron
3. The use of mild steel as a filler metal
4. The failure to use a special flux

4-33. When oxygas welding cast iron, you must preheat the entire weldment to a temperature between 750°F and 900°F. After completing the weld, you must again postheat to a temperature of 1100°F to 1150°F to relieve stresses.

1. True
2. False

4-34. The method of joining a light stainless steel sheet by oxygas welding is characterized by the use of which of the following elements?

1. No flux, a carburizing flame, no puddle, and a relatively small torch tip
2. No flux, an oxidizing flame, puddle, and a relatively large torch tip
3. Flux, an oxidizing flame, no puddle, and a relatively small torch tip
4. Flux, carburizing flame, no puddle, and a relatively small torch tip

4-35. In the oxygas welding of deoxidized copper, you should preheat the joint area to what temperature range?

1. 100°F to 300°F
2. 300°F to 500°F
3. 500°F to 800°F
4. 800°F to 900°F

4-36. Compared with the technique for joining steel parts by the oxygas process, the technique for joining deoxidized copper parts (same welding process and same part thickness) calls for use of a/an

1. smaller torch tip and no preheating
2. larger torch tip and more preheating
3. oxidizing flame and no flux
4. carburizing flame and oxygas brass flux

4-37. What type of rod is used for welding brass by the oxygas process?

1. Lead
2. Steel
3. Silicon copper
4. Silicon bronze

4-38. In the oxygas process of welding parts of copper-nickel alloys, the welder should take which of the following actions?

1. Adjust the flame to a slightly oxidizing flame
2. Agitate the molten puddle when adding filler metal
3. Keep the welding rod end outside the protective envelope of the flame
4. Remove all traces of flux with warm water after welding is completed and the part has been cooled slowly

4-39. To guard against poisonous fumes, you must wear a respirator when welding what type of metal?

1. Silver
2. Aluminum
3. Lead
4. Brass

4-40. When gas welding wrought aluminum alloys, you can minimize cracking by using what type of welding rod?

1. 1100
2. 3003
3. 4043
4. 5511

4-41. Pure aluminum is one fourth as strong as

1. steel
2. iron
3. copper
4. titanium

4-42. When welding aluminum alloy, you use a flux for which of the following reasons?

1. To preserve the luster of the metal
2. To reduce the tendency of the metal to crack
3. To remove the aluminum oxide formed during the welding process
4. To lower the melting point of aluminum

4-43. Edge notching is a recommended procedure for gas welding aluminum plate because

1. it gives a clear view of the weld area
2. it aids in getting full penetration and prevents distortion
3. it allows the torch flame to cover a greater area
4. it allows the welder to use either the forehand or backhand method

4-44. To prevent weakening of aluminum alloys, when preheating is required, you should not exceed what temperature?

1. 300°F
2. 500°F
3. 700°F
4. 900°F

4-45. The forehand method of welding is preferred for aluminum alloys because the flame points away from the weld which preheats the edges to be welded and prevents too rapid melting.

1. True
2. False

4-46. You can reduce the possibility of aluminum alloys cracking during the welding process by taking which of the following actions?

1. Securing the aluminum alloys in a jig
2. Using a 4043 filler rod to cause the base metal to solidify before the weld puddle freezes
3. Tacking the work while clamped in a jig, then loosening the clamps before completing the seam
4. All of the above

4-47. When oxygas welding pipe, which of the following requirements must be met to complete a successful weld?

1. A controlled heat source localized to produce rapid melting
2. Elimination of surface oxides
3. Union of edges or surfaces by means of molten metal
4. All of the above

4-48. What factor determines the soundness and strength of a weld?

1. Torch manipulation
2. Amount of heat used
3. Quality of welding rod used
4. All of the above

4-49. The backhand technique produces faster melting of the base metal surfaces, allows a smaller bevel to be used, and results in a savings of 20% to 30% in welding time, rods, and gases.

1. True
2. False

Learning Ovjective: Identify the characteristics and functions of soldering materials.

4-50. The processes that do NOT require fusion are soldering, brazing, braze welding, and wearfacing. These processes allow the joining of dissimilar metals, producing high strength joints, as well as not affecting heat treatment or warping the original metal as much as conventional welding.

1. True
2. False

4-51. Soldering is a process of joining metals by melting filler metal below what temperature, in degrees Fahrenheit?

1. 800°F
2. 850°F
3. 900°F
4. 950°F

4-52. Which one of the following types of soldering coppers (irons) is used for soldering flat seams requiring considerable heat?

1. Pointed
2. Stub
3. Bottom
4. Top

4-53. The size designation of soldering coppers refers to the weight of two copper heads in

1. kilograms
2. pounds
3. grams
4. ounces

4-54. A pair of coppers has a weight designation of 3 pounds. This designation indicates that each individual copper weighs

1. 1 1/2 kilograms
2. 1 1/2 pounds
3. 10 grams
4. 16 ounces

4-55. What type of file should you use to file a soldering copper head during the filing and tinning process?

1. Rasp
2. Single cut
3. Double cut
4. Half round

4-56. What should you do to carry out the preliminary steps in filing a cold, but once overheated, soldering copper head?

1. Without clamping it in a vise, heat the copper head, but not hot enough to melt the solder
2. Without clamping the copper head in a vise, heat the copper head until it is hot enough to melt the solder
3. Clamp the copper in a vise, then heat the copper head until it is cherry red
4. Heat the copper until it is cherry red, then clamp the copper in a vise

4-57. What technique should you use to manipulate a file?

1. On each forward stroke, bear down and rock the file, and on each return stroke, let up on the file
2. On both forward and return stroks, bear down and rock the file
3. On each forward stroke, bear down on the file without rocking it; on each return stroke, let up on the file
4. On both strokes, bear down on the file without rocking it

4-58. In the forging process of reshaping a copper, you should ensure a sharp point and a long taper is created.

1. True
2. False

4-59. Most solders are alloys consisting of what elements?

1. Lead and tin
2. Cadmium and aluminum
3. Tin, lead, and zinc
4. Tin, lead, and bismuth

4-60. Which of the following solders has the lowest melting point?

1. 30/70
2. 40/60
3. 50/50
4. 60/40

4-61. What characteristic of a solder causes it to change from a solid to a liquid?

1. Its constitutional range
2. Its eutectic composition
3. Its liquidus/solidus point
4. Its temperature differential

4-62. What solder composition is best for joining aluminum alloys?

1. 50% tin, 45% lead, and 5% antimony
2. 63% tin and 37% lead
3. 60% tin and 40% zinc
4. 86% tin, 12% lead, and 2% zinc

4-63. Flux serves which of the following purposes?

1. To clean the metal during the soldering process
2. To harden the solder
3. To soften the metal to be joined
4. To increase the ductility of solder

4-64. Which of the following fluxes is used to solder zinc and galvanized iron?

1. Borax
2. Rosin
3. Sal ammoniac
4. Zinc chloride

4-65. What is the most commonly used non-corrosive flux?

1. Rosin
2. Zinc chloride
3. Soldering salts
4. Sal ammoniac

Learning Objective: Recognize general soldering methods and techniques.

4-66. When heating solder or surfaces that are to be soldered, you should make it a practice to take what action?

1. Heat the surfaces to cherry red
2. Heat just enough to melt the solder
3. Overheat the solder, then allow it to cool slightly to working temperature
4. Heat the surfaces until scum forms, then skim it off and discard

4-67. Heating a solder to a temperature higher than its working temperature increases oxidation and changes the proportions of tin and

1. lead
2. copper
3. aluminum
4. silver

4-68. When using a corrosive flux to solder a joint, you should take what action immediately after finishing the soldering?

1. Sprinkle the joint with a powdered noncorrosive flux
2. Remove all the traces of flux or as much as possible
3. Clean the joint with powdered rosin
4. Clean the joint with a solution of sal ammoniac and water

4-69. When soldering seams that are held together by rivets or other fasteners, you manipulate the copper in what way?

1. Keep it in contact with the work
2. Raise it at regular intervals and retrace the work
3. Raise it at intermittent intervals
4. Hold it slightly above the work as you go

4-70. When soldering a bottom seam using solder beads, you should take which of the following actions?

1. Hold the copper in one position until the solder flows freely into the seam
2. Draw the copper along the seam
3. Turn the work as you go
4. All of the above

Learning Objective: Identify the special methods and techniques of soldering aluminum.

4-71. Which of the following actions should you take before soldering an aluminum alloy?

1. Coat the alloy with noncorrosive flux
2. Remove the oxide that covers the alloy
3. Coat the alloy with a thin layer of tin-lead solder
4. Dip the alloy in a solution of turpentine and powdered rosin

4-72. A thick layer of oxides is present on the piece of aluminum you are going to solder. Which of the following cleaning methods should you use to remove the oxides?

1. Filing
2. Sanding
3. Wire brushing
4. All of the above

4-73. When soldering aluminum with a torch, you should direct the torch flame to what location?

1. The solder
2. The flux
3. The work surface
4. The metal near the work

4-74. What type of solder does NOT require the use of flux when you are using it in combination with aluminum solder?

1. Tin and antimony
2. Tin and lead
3. Tin and zinc
4. Tin and silver

4-75. What type of solder is recommended for food containers?

1. 50% tin and 50% lead
2. 50% tin, 45% antimony, and 2% lead
3. 96% tin and 4% silver
4. 95% tin and 5% antimony